

A Nanoparticulate Photocatalytic Filter for Removal of Trace Contaminant Gases, Phase II

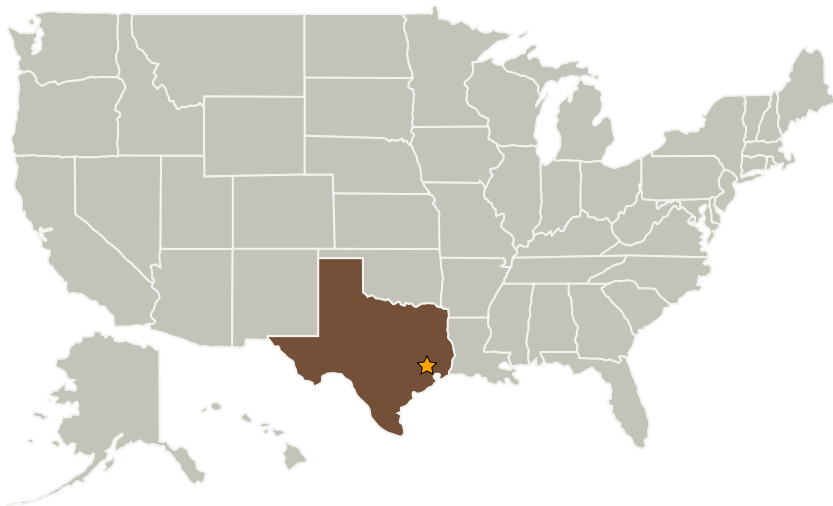
Completed Technology Project (2004 - 2006)



Project Introduction

Maintaining a healthy atmosphere in closed life support systems is essential for crew well being and success of space missions. Current trace contaminant control (TCC) systems for removal of trace contaminant gases from cabin air are based on activated carbon filters and high temperature catalytic oxidation (HTCO). However, HTCO suffers from poisoning, and activated carbon suffers from absorbent saturation, which leads to off gassing. It also generates a secondary waste stream and becomes a microorganism breeding ground. During the Phase I effort, a bench scale TCC system utilizing a nanoparticulate photocatalytic filter was fabricated. Testing performed successfully demonstrated the technology feasibility for eliminating airborne chemicals and microorganisms. Preliminary equivalent system mass analysis shows the system efficacy and applicability to space missions. During the Phase II, a scaled-up, fully operational, flight qualifiable, microgravity compatible breadboard will be developed, tested with chemicals known to be present in International Space Station (ISS) cabin air, and delivered to NASA. Benefits of this reagentless approach are its low cost, low maintenance, reliability, longevity, size, performance, and elimination of a secondary waste stream. Photocatalytic unit implementation would serve to expand the capabilities of TCC technologies for missions beyond the ISS including Lunar and Martian exploration.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Lynntech, Inc.	Supporting Organization	Industry	College Station, Texas

Primary U.S. Work Locations

Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.1 Atmosphere Revitalization